

What Is Claimed Is:

1. An image sensing apparatus comprising:

an image sensing device having an image sensing area which is divided into a plurality of image sensing sections and generates electric signals corresponding to amounts of incident light, and a plurality of output units respectively outputting the electric signals of said plurality of image sensing sections;

a shutter which can open and close an optical path of incoming light to said image sensing device; and

a light source which emits light to at least a part of said image sensing area of said image sensing device so that the light is projected onto said plurality of image sensing sections.

2. The image sensing apparatus according to claim 1, wherein said light source is arranged near said shutter and near a division boundary of said image sensing sections of said image sensing device.

3. The image sensing apparatus according to claim 1, further comprising a light guide that is installed near said light source and projects luminous flux to said image sensing sections of said image sensing device.

4. The image sensing apparatus according to claim 3,
wherein a part of said shutter is used as the light
guide.
- 5 5. The image sensing apparatus according to claim 4,
wherein a screening member of said shutter is used as a
light guide.
6. The image sensing apparatus according to claim 3,
10 wherein an optical element arranged between said
shutter and said image sensing device is used as a
light guide.
7. The image sensing apparatus according to claim 6,
15 wherein the optical element is a protecting member that
protects said image sensing sections of said image
sensing device.
8. The image sensing apparatus according to claim 6,
20 wherein the optical element is a low pass filter.
9. The image sensing apparatus according to claim 1,
further comprising a determination unit that determines
correlation of electric signals outputted by said
25 plurality of output units.

10. The image sensing apparatus according to claim 9,
further comprising a controller that controls said
shutter so that the optical path of incoming light to
said image sensing device is in a screened state, and
5 controls said light source to emit light in the
screened state.

11. The image sensing apparatus according to claim 10,
further comprising a plurality of processors which
10 respectively process the electric signals output from
said plurality of output units of said image sensing
device,

wherein said determination unit determines
correlation between the electric signals in a
15 predetermined image area using outputs from said
processors.

12. The image sensing apparatus according to claim 9,
further comprising a correction unit to correct the
20 electric signals on the basis of the correlation.

13. The image sensing apparatus according to claim 12,
further comprising a combining unit which combines
electric signals of the plurality of image sensing
25 sections corrected by said correction unit.

14. The image sensing apparatus according to claim 12,
wherein the electric signals are corrected using the
correlation.
- 5 15. The image sensing apparatus according to claim 9,
wherein the correlation is a ratio between the electric
signals.
16. The image sensing apparatus according to claim 9,
10 wherein the correlation is difference between the
electric signals.
17. The image sensing apparatus according to claim 9,
further comprising:
- 15 a switch that switches whether or not to operate
said determination unit; and
- memory which stores determined correlation when
said determination unit is operated.
- 20 18. An image sensing apparatus comprising:
- an image sensing device having an image sensing
area which is divided into a plurality of image sensing
sections and generates electric signals corresponding
to amounts of incident light, and a plurality of output
25 units respectively outputting electric signals of said
plurality of image sensing sections; and

a determination unit that determines correlation of the electric signals outputted by said plurality of output units,

wherein the electric signals comprises electric
5 signals produced by emitting light to an area, which crosses over said plurality of image sensing sections and is at least a part of said image sensing area, while screening incoming light into said plurality of image sensing sections.

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19. The image sensing apparatus according to claim 18, further comprising a plurality of processors which respectively process the electric signals output from said plurality of output units of said image sensing
15 device,

wherein said determination unit determines correlation between the electric signals in a predetermined picture area using outputs from said processors.

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20. The image sensing apparatus according to claim 18, further comprising a correction unit to correct the electric signals on the basis of the correlation.

25 21. The image sensing apparatus according to claim 20, further comprising a combining unit which combines electric signals of the plurality of image sensing

sections corrected by said correction unit.

22. The image sensing apparatus according to claim 20,
wherein the electric signals are corrected using the
5 correlation.

23. The image sensing apparatus according to claim 18,
wherein the correlation is a ratio between the electric
signals.
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24. The image sensing apparatus according to claim 18,
wherein the correlation is difference between the
electric signals.

25. The image sensing apparatus according to claim 18,
further comprising:

a switch that switches whether or not to operate
said determination unit; and

memory which stores determined correlation when
20 said determination unit is operated.

26. A control method for an image sensing apparatus
that comprises an image sensing device having an image
sensing area which is divided into a plurality of image
25 sensing sections and generates electric signals
corresponding to amounts of incident light and a
plurality of output units respectively outputting the

electric signals of said plurality of image sensing sections, a shutter which can open and close an optical path of incoming light to said image sensing device, and a light source which emits light to at least a part
5 of said image sensing area of said image sensing device so that the light is projected onto said plurality of image sensing sections, comprising:

a screening step of screening an optical path of incoming light by the shutter;

10 a light emitting step of emitting light by the light source with the optical path screened; and

a determining step of determining correlation between electric signals that are obtained by emitting light in said light emitting step and are outputted by
15 the plurality of output units.

27. The method according to claim 26, further comprising a processing step of separately processing the electric signals output from the plurality of
20 output units of said image sensing device,

wherein, in said determination step, correlation between the electric signals in a predetermined image area is determined using outputs obtained in said processing step.

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28. The method according to claim 26, further comprising a correcting step of correcting the electric

signals based on the correlation.

29. The method according to claim 28, further
comprising a combining step of combining the electric
5 signals of the plurality of image sensing sections that
are corrected at the correcting step.

30. The method according to claim 28, wherein the
electric signals are corrected using the correlation.

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31. The method according to claim 26, wherein the
correlation is a ratio between the electric signals.

32. The method according to claim 26, wherein the
15 correlation is difference between the electric signals.

33. The method according to claim 26, further
comprising:

20 a switching step of switching whether or not to
perform said determination step; and

a storing step of storing determined correlation
when said determination step is performed.

34. A signal processing method for processing signals
25 obtained from an image sensing device having an image
sensing area which is divided into a plurality of image
sensing sections and generates electric signals

corresponding to amounts of incident light and a plurality of output units respectively outputting the electric signals of said plurality of image sensing sections, comprising:

5 a determining step of determining correlation between electric signals that are obtained by emitting light to an area, which crosses over the plurality of divided sections and is at least a part of the image sensing area while screening incoming light into the
10 image sensing sections, and that are outputted from the plurality of output units.

35. The method according to claim 34, further comprising a processing step of separately processing
15 the electric signals output from the plurality of output units of said image sensing device,

 wherein, in said determination step, correlation between the electric signals in a predetermined image area is determined using outputs obtained in said
20 processing step.

36. The method according to claim 34, further comprising a correcting step of correcting the electric signals based on the correlation.

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37. The method according to claim 36, further comprising a combining step of combining the electric

signals of the plurality of image sensing sections that are corrected at the correcting step.

38. The method according to claim 36, wherein the
5 electric signals are corrected by using the correlation.

39. The method according to claim 34, wherein the correlation is a ratio between the electric signals.

10 40. The method according to claim 34, wherein the correlation is difference between the electric signals.

41. The method according to claim 34, further comprising:

15 a switching step of switching whether or not to perform said determination step; and
a storing step of storing determined correlation when said determination step is performed.

20 42. An image sensing apparatus comprising:
an image sensing device having an image sensing area which is divided into a plurality of image sensing sections each of which has a plurality of pixels that generate electric signals corresponding to amounts of
25 incident light, and a plurality of output units respectively outputting the electric signals of said plurality of image sensing sections;

a shutter which can open and close an optical path of incoming light to said image sensing device;
and

a correction unit to correct difference in levels
5 between the electric signals obtained from said plurality of image sensing sections with the optical path being opened by said shutter on the basis of the electric signals outputted from said plurality of image sensing sections with screening the optical path by
10 said shutter.

43. The image sensing apparatus according to claim 42, further comprising a light source for emitting light to at least a part of said image sensing area of said
15 image sensing device so that the light is projected onto said plurality of image sensing sections,

wherein said correction unit corrects difference in levels between the electric signals obtained from the plurality of image sensing sections with the
20 optical path being opened by said shutter on the basis of electric signals outputted from said plurality of image sensing sections while light is emitted by said light source with screening the optical path by said shutter.

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44. The image sensing apparatus according to claim 42, wherein said correction unit has a first setting unit

for setting correction parameters on the basis of electric signals outputted from said plurality of image sensing sections while screening the optical path by said shutter.

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45. The image sensing apparatus according to claim 44, wherein that the correction parameters are at least either of offset values and gain values that are to be applied to electric signals outputted from said plurality of image sensing sections.

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46. The image sensing apparatus according to claim 44, wherein the correction parameters are limiting values of offset values and gain values that are to be applied to electric signals outputted from said plurality of image sensing sections.

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47. The image sensing apparatus according to claim 42, wherein said correction unit performs correction on the basis of electric signals outputted from said plurality of image sensing sections with the optical path being opened by said shutter and signals outputted from said plurality of image sensing sections while screening the optical path by said shutter.

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48. The image sensing apparatus according to claim 44, wherein said correction unit has a second setting unit

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for setting correction parameters on the basis of electric signals outputted from said plurality of image sensing sections with the optical path being opened by said shutter.

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49. The image sensing apparatus according to claim 48, wherein said correction unit performs correction using parameters set by said first setting unit when a parameter set by said second setting unit is out of a predetermined range.

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50. The image sensing apparatus according to claim 48, wherein the correction parameters are at least either of offset values and gain values that are to be applied to electric signals outputted from said plurality of image sensing sections.

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51. The image sensing apparatus according to claim 42, further comprising a switch that automatically switches a main image sensing mode in which an image of an object is recorded by opening the optical path by said shutter, and a pre-image sensing mode in which image sensing is performed while screening the optical path by said shutter.

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52. An image sensing apparatus comprising:

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an image sensing area having a plurality of pixels that generate electric signals corresponding to amounts of incident light;

a shutter that can open and close an optical path
5 of incoming light to said image sensing area;

a light source for emitting light to at least a part of said image sensing area; and

a correction unit to correct an electric signal obtained from said image sensing area with the optical
10 path being opened by said shutter on the basis of an electric signal outputted from said image sensing area while light is emitted by said light source with screening the optical path by said shutter.

15 53. The image sensing apparatus according to claim 52, wherein said correction unit comprises a first setting unit which sets correction parameters on the basis of an electric signal outputted from said image sensing area with the optical path being screened by said
20 shutter, and a second setting unit which sets correction parameters on the basis of an electric signal outputted from said image sensing area with the optical path being opened by said shutter, and

wherein said correction unit performs correction
25 using parameters set by said first setting unit if a parameter set by said second setting unit is out of a

predetermined range.

54. A correction method for correcting difference of levels between electric signals outputted from an image sensing device that has an image sensing area divided into a plurality of image sensing sections each of which has a plurality of pixels that generate electric signals corresponding to amounts of incident light, and outputs the electric signals from said plurality of image sensing sections, comprising:

a correction step of correcting difference in levels between the electric signals obtained from the plurality of image sensing sections with the optical path being opened to said image sensing sections on the basis of electric signals outputted from the plurality of image sensing sections with screening the optical path to the image sensing sections.

55. The correction method according to claim 54, wherein, at said correction step, difference in levels between electric signals obtained from the plurality of image sensing sections with the optical path being opened is corrected on the basis of electric signals outputted from the plurality of image sensing sections while light is projected on at least a part of image sensing area of the image sensing device so that the light is projected onto the plurality of image sensing

sections with screening an optical path to the image sensing sections.

56. The correction method according to claim 54,
5 wherein said correction step has a first setting step of setting correction parameters on the basis of electric signals outputted from the plurality of image sensing sections with screening the optical path.

10 57. The correction method according to claim 56, wherein the correction parameters are at least either of offset values and gain values that are to be applied to electric signals outputted from the plurality of image sensing sections.

15 58. The correction method according to claim 56, wherein the correction parameters are limiting values of offset values and gain values that are to be applied to electric signals outputted from the plurality of
20 image sensing sections.

59. The correction method according to claim 54, wherein, at the correction step, correction is performed on the basis of electric signals outputted
25 from the plurality of image sensing sections with the optical path being opened to the image sensing sections and signals outputted from the plurality of image

sensing sections with screening the optical path to the image sensing sections.

60. The correction method according to claim 58,
5 wherein the correction step has a second setting step of setting correction parameters on the basis of electric signals outputted from the plurality of image sensing sections with the optical path being opened to the image sensing sections.

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61. The correction method according to claim 60,
wherein, at said correction step, correction is performed using parameters set at said first setting step when a parameter set at said second setting step
15 is out of a predetermined range.

62. The correction method according to claim 59,
wherein the correction parameters are at least either of offset values and gain values that are to be applied
20 to electric signals outputted from the plurality of image sensing sections.

63. The correction method according to claim 54,
further comprising a switching step of automatically
25 switching a main image sensing mode in which an image of an object is recorded by opening the optical path, and a pre-image sensing mode in which image sensing is

performed while screening the optical path.

64. A correction method for correcting electric signals outputted from an image sensing area which is divided into a plurality of image sensing sections having a plurality of pixels which generate electric signals corresponding to amounts of incident light, comprising:

10 a correction step of correcting electric signals obtained from the image sensing sections with an optical path being opened to the image sensing sections on the basis of electric signals outputted from the image sensing sections with screening the optical path to the image sensing sections and emitting light to at least a part of the image sensing sections.

65. The correction method according to claim 64, wherein said correction step comprises a first setting step of setting correction parameters on the basis of electric signals outputted from the image sensing sections with screening the optical path to the image sensing sections, and a second setting step of setting correction parameters on the basis of electric signals outputted from the image sensing sections with the optical path being opened to the image sensing sections, and

wherein, at said correction step, correction is performed using parameters set at said first setting step if a parameter set at said second setting step is out of a predetermined range.

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66. A computer program product comprising a computer usable medium having computer readable program code means embodied in said medium for controlling an image sensing apparatus that comprises an image sensing
10 device having an image sensing area which is divided into a plurality of image sensing sections and generates electric signals corresponding to amounts of incident light and a plurality of output units respectively outputting the electric signals of said
15 plurality of image sensing sections, a shutter which can open and close an optical path of incoming light to said image sensing device, and a light source which emits light to at least a part of said image sensing area of said image sensing device so that the light is
20 projected onto said plurality of image sensing sections, said product including:

first computer readable program code means for screening an optical path of incoming light by the shutter;

25 second computer readable program code means for emitting light by the light source with the optical path screened; and

third computer readable program code means for determining correlation between electric signals that are obtained by emitting light and are outputted by the plurality of output units.

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67. A computer program product comprising a computer usable medium having computer readable program code means embodied in said medium for processing signals obtained from an image sensing device having an image sensing area which is divided into a plurality of image sensing sections and generates electric signals corresponding to amounts of incident light and a plurality of output units respectively outputting the electric signals of said plurality of image sensing sections, said product including:

computer readable program code means for determining correlation between electric signals that are obtained by emitting light to an area, which crosses over the plurality of divided sections and is at least a part of the image sensing area while screening incoming light into the image sensing sections, and that are outputted from the plurality of output units.

68. A computer program product comprising a computer usable medium having computer readable program code means embodied in said medium for correcting difference

of levels between electric signals outputted from an image sensing device that has an image sensing area divided into a plurality of image sensing sections each of which has a plurality of pixels that generate
5 electric signals corresponding to amounts of incident light, and outputs the electric signals from said plurality of image sensing sections, said product including:

computer readable program code means for
10 correcting difference in levels between the electric signals obtained from the plurality of image sensing sections with the optical path being opened to said image sensing sections on the basis of electric signals outputted from the plurality of image sensing sections
15 with screening the optical path to the image sensing sections.

69. A computer program product comprising a computer usable medium having computer readable program code
20 means embodied in said medium for correcting electric signals outputted from an image sensing area which is divided into a plurality of image sensing sections having a plurality of pixels which generate electric signals corresponding to amounts of incident light,
25 said product including:

computer readable program code means for
correcting electric signals obtained from the image

sensing sections with an optical path being opened to
the image sensing sections on the basis of electric
signals outputted from the image sensing sections with
screening the optical path to the image sensing
5 sections and emitting light to at least a part of the
image sensing sections.